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UNITED STATES NAVY

MEDICAL NEWS LETTER

Vol. 38 Friday, 7 July 1961 No. 1

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Policy

The U. S. Navy Medical News Letter is basically an official Medical Department publication inviting the attention of officers of the Medical Department of the Regular Navy and Naval Reserve to timely up-to-date items of official and professional interest relative to medicine, dentistry, and allied sciences. The amount of information used is only that necessary to inform adequately officers of the Medical Department of the existence and source of such information. The items used are neither intended to be, nor are they, susceptible to use by any officer as a substitute for any item or article in its original form. All readers of the News Letter are urged to obtain the original of those items of particular interest to the individual.

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Change of Address

Please forward changes of address for the News Letter to: Commanding Officer, U. S. Naval Medical School, National Naval Medical Center, Bethesda 14, Md., giving full name, rank, corps, and old and new addresses.

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Use of funds for printing this publication has been approved by the Director of the Bureau of the Budget (19 June 1958).

Medical Criteria for Passenger Flying

The Committee on Medical Criteria of the Aerospace Medical Association. Aerospace Med 32: 369-381, May 1961, reprinted from Archives of Environmental Health, February 1961.

(NOTE: Because the original report of the Committee was so comprehensive and valuable to physicians in general, the length of this digest exceeds that usually desired for the News Letter. The recommendations and criteria listed are in no way "official"—rather, the provisions of OPNAV INSTRUCTION 4630.9A and 4630.12A continue to apply to official aeromedical evacuation of all military patients. Editor)

The ever increasing number of passengers traveling by air includes a certain proportion who have various types and degrees of clinical disorders. This fact requires that certain medical criteria for passenger flying be established. Passenger air travel has increased 2600% during the last 20 years. More and more often it is found that flying is the most expeditious and desirable form of transportation of the properly prepared and selected patient. Under certain circumstances, flying may be deleterious to the patient and, at times, transportation of patients by air may be inadvisable so far as it affects fellow passengers.

Guiding Principles for Air Travel

When a patient is being considered for air travel, a very basic, and what may appear to be an elementary, decision must be established: Is the patient able to travel or to be moved by any means? This point is sometimes overlooked by the layman and even by the busy practitioner.

After the basic decision has been reached that the patient can be transported, it must be determined if air travel is the most desirable for all concerned. It must be remembered that the basic purpose of a common carrier is to transport members of the public whether it be for pleasure or for business, and that the vehicle is not necessarily to take the place of an ambulance. The general public must be given consideration and not be subjected to unpleasant appearance, odors, or sounds of an invalid patient, or to the ravings and hazards of a psychotic passenger.

Another important factor is the stability of the condition from which the patient suffers. Even though most air liners in flight over the United States are within 30 or 40 minutes of emergency landing facilities and modern medical centers, the general public should not be subjected to the inconvenience of nonscheduled landings and interruption of flight schedules.

Many years ago, an empirical principle was developed which still has considerable merit and is still valid to a great extent: a person who looks normal, feels normal, smells normal, and can walk up the steps of a ramp can fly without likelihood of difficulty. The principle is generally true today and

with the advent of pressurized, high-speed aircraft, it can be expanded somewhat.

Operational Considerations

It is useful and most desirable for the physician who must make a decision as to a patient's travel by air to be aware of, and to possess, some knowledge of certain operational data concerning airplanes. Of particular interest are such factors as speed and duration of flight, altitude within the cabin, availability of oxygen, and ability of the cabin attendants to take care of medical emergencies.

In Table I are some statistics on operational factors of a few aircraft currently in use by American carriers.

TABLE I—OPERATIONAL FACTORS CONCERNING SIX AIRCRAFT COMMONLY EMPLOYED BY AMERICAN CARRIERS

Factor	Aircraft					
	Boeing 707	Douglas DC-8	Lockheed Electra	Vickers Viscount	Douglas DC-7	Convair 240
Speed, cruising (miles per hour)	555	555	405	335	315	245
Speed, take-off (miles per hour)*	190	190	150	130	149	128
Speed, landing (miles per hour)†	155	155	125	136	139	118
Climb, rate (feet per minute), average	1,000	1,000	1,800	900	500	500
Climb, rate (feet per minute), maximal	4,000	4,000	2,200	1,350	2,000	1,000
Descent, rate (feet per minute), average	1,600	1,500	1,500	1,800	1,000	500
Descent, rate (feet per minute), maximal	15,000	15,000	5,000	3,000	6,500	6,000
Range, statute miles	6,100	5,500	3,500	1,400	5,200	1,100
Runway, length needed (feet)‡						
Maximal: take-off	10,500	9,500	4,750	5,440	6,350	4,500
Maximal: landing	6,800	6,700	4,750	4,870	5,100	2,400
Cabin differential pressure, maximal (pounds per square inch)	8.6	8.77	6.5	6.5	5.45	3.5
Capacity, maximal (passengers)	189	189	104	50	99	40
Operating altitude, normal (feet)	25,000 to 40,000	25,000 to 40,000	18,000 to 25,000	16,000 to 25,000	15,000 to 25,000	9,000 to 12,000
Berths available §	(4)	(4)	None	None	mm (4)	None
Litter patients, accommodations for	(4)	(4)	(4)	(4)	(4)	None

* With maximal take-off gross weight.
† With maximal landing gross weight.
§ Availability varies among the various airlines.
‡ At sea level and standard temperature 0 C and standard pressure of 29.92 in. of mercury or 760 mm. of mercury.

One of the most important factors in the comfort of the passengers—and particularly so in transportation of patients by air—is pressurization of the aircraft, since the altitude within the cabin is dependent upon such pressurization. The altitude to which passengers in the cabin are exposed depends upon two factors: first, the actual altitude at which the airplane is flying, and second, the cabin altitude produced by pressurization of the aircraft. To maintain a constant pressure within the cabin in flight, the ratio of compression and the pressure differential across the cabin become functions of altitude.

In actual practice it is easy to calculate the altitude in the cabin if the ambient altitude, the atmospheric pressure at that altitude in pounds per square inch, and the pressure differential of the aircraft are known. The

altitude in the cabin is determined by adding the pressure differential of the specific aircraft to the atmospheric pressure (in pounds per square inch). (See Tables II and III)

TABLE II.—AMBIENT (ACTUAL) ALTITUDES VERSUS CABIN ALTITUDES IN SIX AIRCRAFT COMMONLY USED BY AMERICAN CARRIERS

	Simulated (Cabin) Altitude, Feet, in					
Ambient Altitude, Feet	Boeing 707	Douglas DC-8	Lockheed Electra	Vickers Viscount*	Douglas DC-7	Convair 240
40,000	7,500	7,000				
35,000	5,500	5,000				
30,000	3,700	3,200	8,000			
25,000	1,400	1,000	5,400	7,900	8,000	
22,500	Sea level	Sea level	4,100	6,510	6,500	
20,000			2,650	4,930	5,000	9,700
15,000			Sea level	1,750	1,800	6,000
10,000				Sea level	Sea level	2,000
7,500						200
5,000						Sea level

*Usually operated at a pressure of 5.5 lb. per square inch.

In the interests of safety during flight, oxygen is available on regularly scheduled aircraft. Requirements are rigid and in accordance with current U. S. Government regulation; they depend upon the altitude to which the specific aircraft is allowed to fly by certification. Moreover, regulations require that certain first-aid equipment be carried by passenger aircraft. Additionally, major air lines give the cabin attendants a course in first aid with supplemental instructions on the "Care of a Normal Delivery." Those air lines which use aircraft certificated to fly at altitudes of more than 25,000 feet also give indoctrination course in the physiologic aspects of flight at high altitudes with particular emphasis on use of oxygen and oxygen equipment.

TABLE III.—ALTITUDE VERSUS ATMOSPERIC PRESSURES

Altitude, Feet	Atmospheric Pressure, Pounds per Square Inch
40,000	2.72
35,000	3.40
25,000	5.46
22,500	6.10
20,000	6.75
15,000	8.30
10,000	10.11
7,500	11.20
5,000	12.20
2,500	13.30
Sea level	14.70

Physiologic Considerations

Understanding bodily responses to physiologic stimuli of flying is essential to evaluation of clinical disturbances resulting therefrom. Ordinarily, the "physiologically intact" body will accommodate adequately to stimuli of flight with little or no difficulty. However, when a disease process has altered normal physiology, difficulty may ensue during adjustment to conditions different from those at sea level.

Changes in Atmospheric Pressure

Dysbarism. Increased or decreased barometric pressure may disturb normal physiologic function in a number of ways. This type of disturbance is referred to generally as "dysbarism." Certain preexisting clinical disturbances may predispose individuals to dysbarism. These include: (1) barotitis media—a traumatic inflammation of the middle ear produced by increased or decreased pressure in that structure in relation to the external environment; (2) barosinusitis—lack of equalization of pressure of the air within and outside the sinus accompanied by inflammation of one or several of the nasal accessory sinuses; (3) expansion of gases in hollow viscera, such as the gastrointestinal tract, pulmonary system, or neurologic system following ventriculography or pneumoencephalography.

Hypoxia. Decreased barometric pressure at high altitudes reduces alveolar oxygen pressures. At the cabin altitude of 5000 to 8000 feet of most commercial airplanes, hypoxia has no practical implication in respect to the normal passenger. However, there are clinical disorders in which the slightest decrement in arterial oxygen saturation can precipitate severe difficulties. Patients in whom cardiopulmonary function or the oxygen transport system is impaired must be carefully selected and prepared for air travel.

Acceleration

Up to the present, linear acceleration in the commercial type of aircraft—particularly during take-off when the accelerative force is maximal—appears to cause no difficulties. It may be theorized that minimal pooling of the blood footward in patients with severe hypotension may cause transient symptoms.

Noise and Vibration

From a physiologic point of view, noise and vibration pose no practical problem as far as passenger travel on jet-propelled airplanes is concerned. On the other hand, it may have some causative effect in producing fatigue in the piston-driven type of aircraft.

Turbulence

Turbulence is primarily responsible for occurrence of motion sickness. With the increase in the cruising altitude at which the commercial jet-propelled airplane flies, the degree of turbulence is minimized. Psychologic and physiologic factors must be considered in determining whether a given patient can fly because these factors may predispose the person to airsickness. The threshold to motion sickness may be increased by medication administered prior to flight. Other factors which will decrease the sensitivity to motion are flying at night to reduce visual stimulation, sitting in a reclining position, and occupying a seat toward the center of gravity of the airplane.

Prolonged Immobilization

Ordinarily, the average airplane passenger remains seated and relatively immobile for almost the entire duration of the journey. The average duration of a given flight, however, is being reduced appreciably now since the advent of the jet-propelled airplane.

Contraindications to Flight and Special Precautions

Three principles must be kept uppermost in mind in determination of whether a person is physically and emotionally fit to travel by air:

1. A passenger must have no interference with the supply of oxygen to the lungs.
2. The mechanical expansion of gases in the air traveler must be unobstructed.
3. The passenger must not impose any untoward effects upon the sensibilities, security, and health of his fellow passengers.

Patient Type

Persons who have malodorous conditions, gross disfigurement, or other unpleasant characteristics which might offend fellow passengers should not be transported by public air carrier unless physical isolation can be assured. Persons who have contagious diseases, who are acutely ill, or in a critical condition should not be carried on commercial aircraft. Persons who cannot take care of their own physical needs should not be transported unless, by previous arrangement, a suitable attendant accompanies them. Persons whose behavior might be disturbing or hazardous to other passengers should not be carried on aircraft. This restriction also applies to difficult and badly behaved children and to persons who might become emotionally disturbed.

Organ Systems

Cardiovascular. Persons who have minimal cardiac reserve should travel by air only if oxygen is immediately available for their needs. The same is true of patients recovering from congestive heart failure or recent myocardial infarction. Persons who exhibit cyanosis, severe disturbances of rhythm, persistent arrhythmias resulting in recurrent prostration, syncope or shock-like conditions, those with markedly enlarged hearts, extreme valvular stenosis, convalescent myocardial infarction, marked exertional angina, severe hypertension and hypertensive encephalopathy, or any other condition which restricts the cardiac reserve to such an extent as to render the patient unable to climb one flight of stairs without production of symptoms or severe dyspnea should be carefully evaluated before they are advised that air flight is safe for them.

The American College of Chest Physicians suggests that those who have major cardiac disorders but adequate functional reserve at sea level may travel

at a cabin altitude of 8000 feet, and that those who have cardiac conditions in which myocardial oxygenation is marginal should not travel at cabin altitudes of more than 6000 feet.

Patients with histories of previous or existing thrombotic or venous disease should be instructed against remaining immobile for long periods during air flight. Immobility and the associated venous stasis in the limbs are believed to be important factors in development of "passenger phlebitis" which may result in pulmonary infarction.

Bronchopulmonary. Apparently there is no contraindication to air travel on the part of an asthmatic person if his condition can be controlled with medication and if oxygen is available for his needs. Patients for whom artificial pneumothorax has been established should be cautioned not to fly immediately after a refill; an interval of 10 days after this procedure usually being recommended before such patients can embark on aerial flights. A patient with suspected pulmonary tuberculosis should be advised not to fly, not because of any threat to his own health, but because of the communicable nature of the disease and the public health problem which it presents.

Persons whose vital capacity is 50% or less do not do well in unpressurized aircraft unless a flight altitude of less than 5000 feet is maintained. Pulmonary function and reserve should be evaluated in order to determine whether persons with pulmonary emphysema or severely limited ventilation arising from pulmonary fibrosis should travel by air. Pulmonary secretions tend to thicken in the drier air present in flight and difficulty with coughing and expectoration may be encountered.

Air hunger is associated with a lessened amount of available oxygen in the ambient atmosphere at higher altitudes due to the decreased partial pressure of oxygen. True air hunger is physiologic. Frequently, however, such a state is mistakenly associated with hyperventilation or a dyspneic type of respiration which generally is the result of apprehension or anxiety. In the presence of true air hunger, supplementary oxygen will alleviate the symptoms. When the dyspneic type of respiration resulting from anxiety is at hand, inhalation of carbon dioxide, rebreathing with a paper bag, or simple holding of the breath will bring prompt relief. If oxygen is administered over long periods, carpopedal spasm may develop. Reassurance is calming and has a beneficial effect in both situations.

Gastrointestinal. Expansion of intestinal gases ordinarily is easily handled by eructation or expulsion of flatus. Occasionally, however, problems are encountered among persons who have a spastic gastrointestinal tract. Distention of the bowel in such persons can result in severe pain which progresses, in some, to shocklike conditions. Antispasmodic medication before an air flight will aid such travelers. Since expansion of intestinal gases is approximately 50% at an altitude of 10,000 feet, and 100% at 18,000 feet, disruption of a recently performed intestinal surgical procedure could result in peritoneal soiling or some other postoperative catastrophe. It is advisable that a 10-day delay in air travel be proposed after an operation. Persons who have undergone colostomy should be warned of the problem of expansion of intestinal gases.

Neuropsychiatric. The safety of the other passengers and crew should be evaluated when a person in a psychiatric state is being considered for travel by air. However, judicious use of ataractic medication should reduce the incidence of neuropsychiatric problems.

Epileptic persons appear to be more susceptible to convulsive seizures in aircraft than elsewhere. Therefore, such persons should travel with a companion when at all possible. Sedation before flight, reassurance, and proper oxygenation during flight usually permit epileptic persons to travel satisfactorily by air provided the aircraft is pressurized to the extent that the simulated cabin altitude will not exceed 8000 feet.

Motion sickness is no longer a major issue in present day airline operation. It is, however, still the most common physiologic disturbance associated with flight. The underlying factors of anxiety, apprehension, and fear are strong predisposing influences. Practical advice for those who are susceptible to development of motion sickness is to avoid window seats on the left (most turns are to the left), secure a seat at the root of a wing, and place the seat in the reclining position. These precautions, with assurance by the physician and flight attendants and premedication with one of the antimotion sickness agents, will reduce the incidence of this condition. Other suggestions, such as abstinence from alcohol prior to or during flight, flying at night to reduce visual stimulation, and the taking of a light meal prior to embarking, also are valuable

Ear, Nose, and Throat. Equalization of pressure in the accessory nasal sinuses is basically automatic, but it may be interfered with by such conditions as swollen or redundant mucosa or nasal polyps. Persons who have acute respiratory infections, allergic rhinitis, or nasal polyposis should be advised to use nasal vasoconstricting or decongestant agents during flight, and particularly prior to ascent and descent. It is unwise for persons with sinusitis or otitis media to fly during the acute stage of the disease. Infants should be nursed during descent so that their eustachian tubes will be kept open by swallowing movements. Persons who have undergone fenestration operations might experience vertigo during steep turns and banks of the aircraft. It is wise to advise such persons to be certain that the canal of the affected ear is dry prior to ascent or descent.

Persons who have sustained a fracture of the mandible for which permanent wiring of the jaws has been done should not travel by air because of the possibility of motion sickness, emesis, and aspiration of the vomitus. Several quick-release mechanisms have been developed. Premedication with antimotion sickness agents may be helpful; many can be obtained in liquid form.

The changes in barometric pressure which occur with changes in altitude are the basic reasons for difficulty with the ears during flight. In the normal ear, equalization of pressure between the middle ear and the ambient atmosphere is achieved automatically upon ascent. During descent, however, conscious voluntary actions must be undertaken to gain and to maintain equilibrium between the pressure in the middle ear and that in the cabin.

Miscellaneous. Anemia— Severe anemia or blood dyscrasia of any type which interferes with oxygen transport usually produces anemic hypoxia

and impairs the physiologic response to mild degrees of hypoxia. Severe anemia exists when the content of hemoglobin is less than 8.5 gm/100 ml blood or when erythrocytes number less than 3,000,000/mm^3 of blood.

Sickle-Cell Disease—It has been demonstrated that in the presence of mild-to-moderate deficiency of circulatory oxygen—to the degree encountered in unpressurized cabins at altitudes of 8000 to 14,000 feet—sickling and hemolysis may take place in those persons with this disorder. It is not absolutely necessary that frank sickle-cell disease be present; persons in whom analysis discloses presence of S and C hemoglobins should be advised not to fly. Although the incidence of this condition is relatively low, it should not be overlooked, and Negro passengers would be well advised to notify the flight attendant if they experience abdominal discomfort or pain. Early administration of oxygen tends to prevent additional symptoms.

Infants—Infants 7 days old and older may be transported by air. Prior to such an age their respiratory mechanisms are not yet sufficiently firmly established to allow them to tolerate the respiratory stresses which may be encountered in flight.

The Aged—Old people with well compensated cardiovascular and respiratory systems tolerate air flight excellently. There are no contraindications to flying based on advanced age alone.

Ophthalmic Conditions—Since, during treatment of an injured eye or after operation upon an eye, air may have been injected into the anterior chamber to preserve the shape of the globe, the physician who has had such a patient should be aware of the problem of expanding gases in flight. Since the retina has the highest oxygen demand of any tissue of the body, patients with serious ophthalmic conditions should be provided with oxygen if they must travel at a cabin altitude in excess of 5000 feet. At altitudes of more than 10,000 feet, hypoxia produces dilatation of the retinal and choroidal blood vessels, a measurable increase in intraocular tension, and reduction in diameter of the pupil. These effects, singly or in combination, are detrimental to the injured, post-surgical, or glaucomatous eye.

Pregnancy—Most air lines feel that the only contraindication to air transport of the pregnant woman is the danger of precipitous delivery during flight. All lines accept pregnant women during the 7th month of gestation and most will transport those in the 8th month. To be accepted for air transport during the 9th month, the pregnant woman must present certification of examination within 72 hours of departure with the finding of fitness for transportation by air.

Pregnant travelers should select rearward-facing seats to allow use of a loosely fastened seat belt across the thighs. In women near term, it is not unusual for false labor pains to develop within a day or so after flight.

Diabetes Mellitus—This disease is no contraindication to travel by air, with common-sense preparation and precautions. Diabetic persons whose disease is not well controlled are more subject to hypoxia if the blood sugar is lowered to values at which hypoglycemia occurs.

Poliomyelitis—Patients who have had poliomyelitis are acceptable for air travel provided one month has elapsed since the onset of the disease. If

the patient is not ambulatory, a special attendant is required. Occasionally, special arrangements can be made with some air lines to transport persons recovered from the bulbar type of poliomyelitis. In this type of case, preparation must be made by the air line concerned to have the proper power supply (correct voltage and wattage) for activation of the portable respirator, if this apparatus is required.

Communicable Diseases—Patients with communicable diseases are not accepted for flight because of the danger to other passengers. Particular care must be taken to avoid air transportation of persons with any of the international quarantinable diseases: smallpox, cholera, plague, typhus, relapsing fever, and yellow fever.

Other Conditions—Some persons and patients require careful study and—if they are transported—special handling. These include patients with mediastinal tumors, extremely large unsupported hernias, intestinal obstruction, cranial diseases involving increased pressure, disturbance of the cerebrospinal circulation, tumor of the brain or fracture of the skull, injuries to the spinal cord, recent cerebrovascular accidents, and angioneurotic edema with a history of laryngeal involvement. Patients who have sustained multiple fractures and prospective passengers wearing body casts also should be considered carefully. In general, casts affixed within 24 hours of flight should be bivalved to assure access during air transportation if such is required.

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The Changing Clinical Picture of Digitalis Intoxication

Alfred Soffer MD, Cardiopulmonary Laboratory, Rochester General Hospital, Rochester, N.Y. Arch Intern Med 107: 681-688, May 1961.

Twenty-four recent cases of digitalis toxicity were characterized by four salient points:

(1) Nine cases (37%) were identified electrocardiographically by atrioventricular dissociation with an AV nodal rate above 70.
(2) The average age in this group was 69. 7 years.
(3) Twenty cases (83%) were induced by digoxin.
(4) Nineteen patients (79%) were on chlorothiazide or mercurial diuretics.

Because the average age was in the seventh decade, it must be assumed that the aging patient is the most likely candidate for such toxicity. It is a particularly tragic paradox that those who most require the unique action of digitalis are the most intolerant to slight variations in dosage. Indeed, in repeated cases as the ratio between therapeutic and toxic dosage narrowed, it was impossible for the aged heart to tolerate any therapeutic amount of digitalis. It must be stressed that an aged heart is used in this paper to signify a heart with profound and long-standing pathology. Though comparable cardiac enlargement can occur in young patients with rheumatic and congenital heart lesions, in

actual fact with but one exception toxicity appeared in our patients in the presence of cardiomegaly and congestive failure which had become prominent after the age of 60. Thus, by prolonging the life span in this country, the face of digitalis intoxication has altered because patients with advanced cardiomegaly survive for many years and reach the point where the physician is presented the baffling challenge of digitalis intolerance.

Criteria for Diagnosis

For diagnosis of toxicity, it was necessary that these criteria be met:

(1) An arrhythmia attributable to the action of digitalis in excess must be present. Sporadic ventricular premature contractions are not considered diagnostic unless associated with gastrointestinal, neurologic, or other clinical evidence of toxicity; but bigeminy, repetitive, and bidirectional ventricular beats are felt to be highly suspicious.

(2) The arrhythmia must occur concomitantly with increase in digitalis dosage or with appearance of factors which decrease myocardial tolerance to digitalis.

(3) The arrhythmia must disappear with decrease of dosage or cessation of digitalis therapy.

Data of Observed Cases

Arrhythmias. It is not surprising that nearly every type of atrial and ventricular arrhythmia is represented as a direct result of digitalis intoxication. Perhaps the most startling statistic is that 9 patients presented a pattern of atrioventricular dissociation with nonparoxysmal tachycardia, whereas only 2 patients experienced paroxysmal atrial tachycardia with block. It has been stressed by Pick that digitalis in excess may enhance the automaticity of the atrioventricular node and produce complete or incomplete atrioventricular dissociation. Some degree of AV nodal block was present in many of these cases, but if the nodal rate was above 70 per minute in the presence of sinus rhythm, or 100 per minute in the presence of atrial fibrillation, it was considered that the rhythm was due predominantly to an enhancement phenomenon rather than secondary to heart block. Awareness of the pharmacologic "clue" of a rapid AV nodal rate has been of life-saving importance in this series.

Clinical Status. Twenty-two of the 24 patients had significant cardiomegaly. The exceptions included one case of acute coronary thrombosis with myocardial infarction; these patients are known to require careful adjustment of digitalis dosage. Eighteen patients were diagnosed as having atherosclerotic heart disease, and 2 patients were felt to have hypertensive atherosclerotic involvement.

Signs and Symptoms of Toxicity. Only 10 patients experienced marked nausea or emesis at the time of maximum digitalis toxicity; 2 patients had diarrhea. Digitalis overdosage was suspected in 5 cases because of refractory edema; in 3 of these instances the patient's clinical state actually deteriorated

as the result of such toxicity. Two patients manifested disorientation and near coma as a result of drug excess. A clouded mental state has been reported by other authors as a result of intoxication.

Diuretics and Serum Potassium. Nineteen patients were being treated with diuretics at the time of digitalis toxicity. It is understandable that potent diuretics which induce potassium diuresis may precipitate or aggravate digitalis intoxication. However, serum determinations of potassium were of no value in the majority of cases in detection of potential digitalis toxicity since serum hypokalemia occurred in only 3 patients. It has been noted that in the majority of patients with advanced failure, potassium deficits are limited to the nonextra cellular compartments and therefore cannot be detected by determining serum electrolyte concentrations. Lack of correlation between serum levels and the actual state of the myocardium is disturbing, but a new technic promises much. Kanosky and associates have found a more exact correlation of electrocardiographic evidence of potassium imbalance and intracellular potassium content of erythrocytes. This is consistent with the previous finding that digitalis blocks the entrance of potassium into red blood cells.

Dosage and Preparations. Two patients were on whole leaf, two on digotoxin, and the remainder on digoxin. The daily maintenance dosage of digoxin precipitating toxicity ranged from 0.25 mg to 0.75 mg, and in 2 cases was precipitated by 0.5 mg and 1.0 mg given IM to patients who were on maintenance schedules of 0.25 mg. The patients on whole leaf were receiving 0.1 gm daily and 0.1 gm alternating on odd days with 0.2 gm. The 2 patients on digitoxin were on 0.1 mg and 0.2 mg daily, respectively. No patient given oral preparations developed toxicity from the initial digitalizing dose, but in 5 cases, toxicity was produced by parenteral digitalization. The range of dosage producing toxicity varied from 2.7 mg IM given in 3 days to 0.5 mg given IV following an acute coronary thrombosis. Since initial digitalizing doses produced toxicity only if the route was parenteral it may be presumed that there is not enough awareness of the fact that, because of incomplete gastrointestinal absorption, the parenteral and oral dosages of digoxin are different. Initial parenteral administration of 1.5 mg of digoxin has been recommended; but in the age group described in this paper such dosage would frequently be excessive.

Comment

These observations show that purified, rapidly excreted glycosides readily produce toxicity, the signs and symptoms of which may extend well beyond the 4 or 5 days theoretically required for digoxin excretion. A heart with advanced congestive failure has diminished intracellular potassium stores, explaining ready precipitation of intoxication with even small amounts of digitalis. Further loss of myocardial potassium induced by digitalis overdosage aggravates and perpetuates this period of refractory congestive failure. In such patients it is of urgent importance to make frequent observations, particularly since "Once toxicity emerges, a substantial percentage of the fatal dose has been given."

Frequent ECG tracings are a necessity; in the aged the sole manifestation of toxicity may be rhythm or conduction changes. Therapy with oral or parenteral potassium is of value in moderately advanced cases; such replacement therapy in patients with advanced disease may only produce serum hyperkalemia. Monopotassium glutamate is probably safer and more effective than other potassium salts; IV potassium chloride is always potentially dangerous in the presence of heart block or if given rapidly. Thus, there remain many patients for whom potassium (except monopotassium glutamate) and digitalis therapy are contraindicated for all time or until other measures relieve the degree of cardiac decompensation and facilitate motion of potassium intracellularly. Calcium chelation may relieve signs of myocardial potassium deficiency; we have used the disodium salt of ethylenediaminetetraacetic acid, edathamil (EDTA), in a series of 58 cases for this purpose, but its transitory action and side effects prohibit continuous application.

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MISCELLANY

Chief of Naval Operations Addresses Hospital Administration School Graduates

As a fitting climax to the intensive 10-month course, graduates of the Naval School of Hospital Administration were privileged to hear an address by Admiral Arleigh A. Burke, United States Navy, Chief of Naval Operations and Member of the Joint Chiefs of Staff. Graduation exercises for the 34 Navy Medical Service Corps officers constituting the 1960 - 1961 class were held on 14 June 1961 in the auditorium of the School. Some of the expressions of appreciation and commendation made by Admiral Burke should be of interest to all Medical Department personnel.

"The reputation of the Naval School of Hospital Administration is much admired and highly respected. And this admiration and respect is well deserved. For the graduates of your school have performed in an outstanding manner at our naval hospitals and in many other demanding billets throughout the Navy.

We, in the Navy, are justly proud of the health and physical welfare of our personnel and their dependents. And, in great part, this effective and efficient medical care depends on the abilities, the energy, and the hard work of our Medical Service Corps. The management of medical resources has become a vital part of modern medical practice. For the finest surgeon must look to a smoothly functioning staff, to a well run medical

organization, for the support and assistance he needs to reap the full benefits of his own hard won knowledge and skill.

The Medical Service Corps has earned the high esteem of our Navy doctors and nurses. Most importantly your performance is reflected in the sincere gratitude of the hundreds of thousands of patients that are served by our Naval medical facilities all over the world.

The United States Navy is deeply proud of our Medical Service Corps with its tradition of intelligence, initiative, and integrity. By contributing to the health, the physical welfare of our Navy men and their families, you make a vital contribution to the United States naval power, and to the security of our wonderful country."

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Procurement of Flashlights

It has been brought to the attention of the Bureau of Medicine and Surgery that flashlights for general use are being procured under FSN G 6230-270-5418, Flashlight, Standard Cell Type, Water-tight, from GSSO, at a cost of $1.30 per unit.

The GSA Catalog lists FSN 6230-242-0005, Flashlight, General Service, at a cost of $0.52 per unit. Procurement of this flashlight would result in a monetary savings of $0.78 per unit. Activities are advised that current regulations do not preclude the requisitioning of standard items from any Federal Supply activity whenever monetary savings or other factors, such as type item desired, end usage, et cetera, are involved. In fact, this practice is highly encouraged.

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From the Note Book

Nato Aeromedical Working Party. During May, CAPT M. H. Goodwin MC USN and CAPT Frank B. Voris MC USN of the Aviation Division of BuMed attended this meeting in London. Deliberations related to standardization of varied matters in aviation medicine, such as airborne personal equipment, criteria for selection of aviators, and minimum requirements for physiologic training of aviators.

Clarification? In the 2 June issue of the News Letter, page 21, in inviting attention to the requirements for taking examinations of the American Board of Obstetrics and Gynecology, the requirement dealing with list of hospital admissions is fully discussed in the current Bulletin of the Board, which should be consulted. Further discussion here may only add to the confusion! Editor

Uniformed Services Almanac. A recommended item for military personnel and their dependents is the Uniformed Services Almanac. This annual publication relates in clear form the various benefits and rights of members

of the Armed Forces and their dependents. Although the book is not an official DOD publication, its editors worked closely with top DOD officials in compiling material for the book which includes description of dependents' medical benefits, retirement, social security, FHA in-service home buying, and all aspects of pay. The book can be bought for $1.00 from Uniformed Services Almanac, P.O. Box 400, Washington 4, D. C. (TIO, BuMed)

NIH Seeks Referrals for Mediterranean Fever Research. The National Institutes of Health Clinical Center asks cooperation of physicians for referral of patients for a comprehensive study of familial Mediterranean fever (periodic fever, paroxysmal peritonitis). Cold sensitive patients or those vulnerable to seasonal variations of attacks are especially sought. For information physicians should communicate with Dr. Sheldon M. Wolff, NIH, Bethesda 14, Md.

Poliomyelitis Incidence. Reported cases of poliomyelitis continue at a remarkably low level. Cases for the week ending 17 June bring the total in 1961 to 202 cases, 131 paralytic. The number of paralytic cases reported thus far is just over half the number reported during this same period in 1958, the lowest previous year in over a decade. (Morbidity and Mortality, PHS, DHEW, June 23, 1961)

Hazards of Cold Immersion. In a talk recently given at the Naval Medical Research Institute, W. R. Keatinge, currently doing cardiovascular research in this country and soon to return to England to continue research at Oxford University, reported observations made by the British Royal Navy and Medical Research Council in relation to hazards of cold immersion. It was found that physical exertion accelerated the rate at which deep body temperature falls in cold water regardless of whether the victim works moderately or as hard as possible, whether he wears clothes, or whether the water is agitated. Alcohol ingestion rather surprisingly failed to increase the rate at which experimental subjects' temperatures fell in cold water; on the other hand, it greatly reduced their discomfort. It becomes evident that men should not attempt to keep warm by swimming when waiting for rescue from cold water, and if possible, should float still with the aid of a life jacket. External protection is clearly highly important during immersions at near-freezing temperatures; even conventional nonwaterproof clothing gives a striking amount of protection under these circumstances.

Actinospectacin, A New Antibiotic. Data are presented demonstrating the antimicrobial activity of a new antibiotic, actinospectacin. It is active in vitro and in vivo against a variety of both gram-positive and gram-negative organisms, although it elicits a greater response in vivo than might be expected from its in vitro activities. Resistance in vitro by Staph. aureus develops rapidly but organisms other than staphylococci do not. The antibiotic has been shown to be effective against a variety of infections in vivo, more so by parenteral administration than oral. It is not cross resistant with other antibiotics. (C. Lewis and H. Clapp, Antibiotics and Chemotherapy, February 1961)

DENTAL SECTION

What Motivates Children to Practice Good Oral Hygiene

Nancy J. Dudding and Joseph C. Muhler, Department of Chemistry, Indiana University, Bloomington, Ind. J Periodont 31:141-142, April 1960; abstr in Dental Abstracts, December 1960.

The question, "Where did you learn to brush your teeth?" was asked of 374 children ranging in age from 6 to 14 years, all residing in Bloomington, Ind. Earlier, each child had been classified as having either "good" or "poor" oral hygiene, based on oral examination.

Of the children classified as having good oral hygiene, 61% said they learned oral hygiene practices from a dentist; 4%, hygienists; 19%, parents; 2%, television; 6%, school; and 8% said they didn't know.

Of the children classified as having poor oral hygiene, 33% said they learned oral hygiene practices from a dentist; 11%, from hygienists; 4%, parents; 15%, television; 0%, school; and 37% said they didn't know.

The results provide proof of the dentist's influence on the practice of good oral hygiene habits by children. When the dentist spends some time with the child in teaching him how and when to clean his teeth, the child will respond by having a clean mouth.

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Untoward Reactions to Local Anesthetics

JAMA 172:769, February 13, 1960; abstr in Dental Abstracts, December 1960.

Q. Can intradermal or conjunctival tests be used to determine a patient's sensitivity to local anesthetics? If the patient does have such a sensitivity, is it possible to desensitize him?

A. Although local anesthetic agents may produce an abnormal systemic reaction in a patient, it is doubtful that any anesthetics commonly used could cause true tissue sensitivity that would be prevented by graduated doses of these agents. Allergic manifestations of this nature usually depend on the presence of a protein which is involved in the antigen-antibody reaction.

Reactions to local anesthetic agents administered to the patient prior to

dental treatment consist of palpitation, dizziness or fainting. These can be caused by epinephrine or other vasoconstrictors in the solution, or by emotional instability of the patient. Any local tissue swelling which may occur has been attributed to histamine release and can be prevented by administration of an antihistaminic drug. Localized tissue swelling also can be the result of increased reaction by the patient's tissue to trauma.

Future management of a patient who has had one episode of local tissue swelling and may need further dental treatment would require taking a history of the agents used prior to the reactions and determining whether or not vasoconstrictors had been included in the solutions. Since anesthetic agents of distinctly different structure and composition are available, it is possible to use one not related to the one previously administered. Although the value of skin testing is questionable, it should be performed with the agent to be used. Use of vasoconstrictors should be avoided; it might be wise to give the patient an antihistamine prior to injection of the anesthetic. Should skin tests indicate a reaction, the local nerve block technic should be avoided, and a general anesthetic, such as nitrous oxide, given.

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Veterans Medical Benefits

It has been reported by the Veterans Administration that an increasing number of veterans being discharged following peacetime service only are being misinformed concerning their entitlement to Veterans Administration medical benefits.

SECNAV NOTICE 1760 of 11 May 1961 is to promulgate information concerning entitlement of peacetime veterans to Veterans Administration medical benefits.

To be eligible for medical/dental care from the Veterans Administration, a veteran with peacetime service only must meet one of the two basic requirements as defined in Title 38, United States Code, as follows:

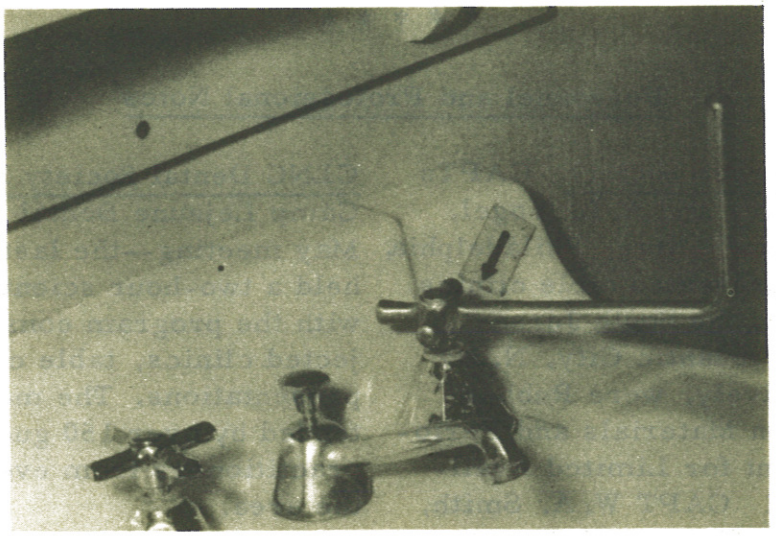
"A Veteran whose discharge or release from active military, naval, or air service was for a disability incurred or aggravated in line of duty, and a person who is in receipt of, or but for the receipt of retirement pay, would be entitled to, disability compensation."

In view of these requirements a peacetime veteran who is not discharged for disability is not eligible for Veterans Administration hospital care or outpatient treatment until he has filed a claim with the Veterans Administration and it is established that he has a compensable service-connected disability. If the veteran's service-connected disability is not sufficiently disabling to permit a compensable rating he is disqualified for Veterans Administration medical care.

* * * * * *

Conversion of Dental Operating Room Lavatory

A relatively simple alteration to an ordinary lavatory as shown in the illustration has greatly improved the aseptic technic in dental operating rooms at the U. S. Naval Station, Sangley Point, Philippines. Captain F. D. Etter DC USN, Senior Dental Officer at the Naval Station, reported that the alteration was accomplished by brazing a brass rod to the spigot handle. This modification results in an economical conversion of a lavatory where usual knee operated or elbow controlled units are not available.



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Russian Dental Mission Visits Naval Dental School

Capt A. R. Frechette DC USN, Commanding Officer, U. S. Naval Dental School, National Naval Medical Center, Bethesda, Md., acted as host to members of the Russian Dental Mission when they visited the School on 16 May 1961. The Mission has been touring the United States under the auspices of the U. S. Department of State and the American Dental Association.

Members of the Mission were: Dr. Aleksei Ivanovich Doinikov, Moscow Stomatological Institute; Mr. Vladimir Feodorovich Chekin, Director of Laboratory of Surgery, Moscow; Dr. Voyacheslov Ivanovich Karnitski, Omsk Institute, Siberia; Dr. Anatoli Ivanovich Rybakov, Moscow Stomatological Institute; and Dr. Antonina Illarionovna Pozdnyakova, Kiev Medical Institute. Mr. Joseph Lewin of the U. S. Department of State acted as interpreter, and Mr. H. M. Christensen represented Dr. C. Willard Camalier, Director, Washington Office, American Dental Association.

The program at the Dental School included a tour of the school facilities and a series of talks given by staff officers on the following subjects: Scope of Maxillofacial Surgery in a

U. S. Naval Hospital, Heterogenous Bone Grafts, Endodontics, Ultrasonics Applied to Periodontal Curettage, Complete Dentures, Splints for Surgical Application, Partial Denture Design, and Operative Dentistry. A luncheon was given for the members of the Mission at the Commissioned Officers' Mess.

Speaking for the members of the Russian Dental Mission, Dr. Doinikov expressed their gratitude for the hospitality extended to them by the commanding officer and the staff of the Dental School. He also stated that they are looking forward to the scheduled exchange visit by the American Dental Association Mission to Moscow in the near future.

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Personnel and Professional Notes

DOs at South Jersey Society. CAPTs J. E. Faltermayer and A. L. Vogel, U. S. Naval Dental Clinic, Philadelphia, Pa., recently presented table clinics at the meeting of the South Jersey Dental Society, Atlantic City, N. J.: topics, respectively, were Rubber Base Impression Materials and Periodontal Treatment for Limited Availability Patients. CAPT W. A. Smith, District Dental Officer, 4th Naval District and CO of the Dental Clinic, also attended.

CAPT Frechette Presents Paper. CAPT A. R. Frechette DC USN, Commanding Officer, U. S. Naval Dental School, recently delivered a paper, The Influence of Balanced Occlusion and Tooth Position on the Stability of Complete Dentures, at the annual meeting of the Academy of Denture Prosthetics, held in Minneapolis, Minn.

CAPT Pridgeon at N. C. Society. CAPT C. T. Pridgeon, Base Dental Officer, Marine Corps Base, Camp Lejeune, N. C., presented a table clinic, Everyday Periodontics, at the 105th Annual Session of the North Carolina Dental Society at Pinehurst during May.

CLNC Dental Society Meeting. The Camp Lejeune Dental Society at its May meeting—the last of the season—held a two-hour scientific session, with the program consisting of projected clinics, table clinics, and case presentations. The meeting was attended by over 150 guests including practitioners from every county in the area.

Guest Speaker at Pendleton. During May, the Camp Pendleton Dental Group heard Dr. Ralph F. Sommer, Head, Departments of Endodontics and Radiology, University of Michigan, discuss What Every Dentist Should Know About Endodontics.

El Toro DOs Host to Society. During May the Dental officers attached to U. S. Marine Corps Air Station, El Toro (Santa Ana), Calif., were hosts to the members of the Orange County Dental Society for its Annual Scientific and Professional Meeting. Table clinics were presented by CAPT G. W. Gray—Remount Procedures in Complete Dentures—and LT T. F. Coad—Bleaching Endodontically Treated Teeth.

Guest Speakers at NDS. Two guest speakers recently addressed the staff, residents, postgraduate Dental officers, and civilian and military guests at the U. S. Naval Dental School, NNMC, Bethesda, Md. On 12 May, Dr. Muller M. DeVan, Professor and Chairman of Prosthetic Dentistry at the Graduate School of Medicine, and Supervisor of Postgraduate Courses in Partial and Complete Prosthetics at the School of Dentistry, University of Pennsylvania, lectured on Patient-Dentist Relationship in Prosthodontics. On 25 May, Dr. John P. Frush, San Marino, Calif., presented a day's program on Dental Esthetics and Related Prosthodontic Procedures. Dr. Frush, at present on the Postgraduate Staff of the University of Southern California and a teacher at the Dental Extension Division of the University of California, is considered one of the foremost authorities on esthetics. He has conducted Dentogenic Seminars for many years and has condensed the efforts of his work and findings into recent publications and a book, Dentogenic Restorations and Dynesthetics.

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RESERVE SECTION

THE BERRY PLAN

Armed Forces Physicians' Appointment and Residency Consideration Program

I. THE PROGRAM

A. The Armed Forces Physicians' Appointment and Residency Consideration Program (formerly the Armed Forces Reserve Medical Officer Commissioning and Residency Consideration Program) provides a means by which (a) physicians who are liable for active duty may volunteer for a Reserve commission in one of the military services, and may be brought to duty at a mutually acceptable time, and (b) the Army, Navy, and Air Force may obtain from among those volunteers the required number of general duty physicians and specialists. To fill projected requirements of the services for specialists, the Department of Defense will sponsor the deferment of a selected number of Reserve officers who will be permitted to complete residency training before being called to active duty. This program was developed with the authorization and cooperation of the Director, Selective Service System.

B. No additional obligated military service is required as a result of participation in this program. Participants

must serve on active duty only for the period for which they are obligated under the Universal Military Training and Service Act.

C. During fiscal year 1963 (1 July 1962 - 30 June 1963) the Department of Defense will have an extensive requirement for personnel to fill positions vacated by military medical personnel who will be completing their 2-year tour of duty and physicians who will be leaving the service for other reasons. It is anticipated that enough volunteers will be obtained from this program to fill the need. However, special draft calls will be placed with Selective Service for any deficit, and physicians who wait for a draft call must be prepared to enter military service at the time of the call even though in residency training. Those with dependents may be used to fill special calls, and individuals classified IV-F as "Regular" registrants will be subject to reclassification when called as physicians. Those who apply for Reserve commissions after having been ordered for induction by the Selective Service System will not have a choice of service, or selection of the time of entry on active duty.

D. For physicians graduating from medical school in 1961 who do not wish to subject themselves to the uncertainty of the draft, the Armed Forces, through this program, offer a Reserve commission with entry on active duty at one of the following times:

1. Immediately upon completion of internship (Post-Internship Duty).
2. As late as 1 year following completion of internship (Delayed Duty).
3. Upon completion of residency training in specialties required by the Armed Forces (Deferment for Residency Training).

II. QUALIFICATIONS

A. For commissioning and call to duty, or residency deferment consideration, participants must meet all of the following requirements:

1. Be a 1961 graduate of a medical school which meets the criteria of the Council on Medical Education and Hospitals of the American Medical Association, or possess unrestricted ECFMG certification.
2. Be liable for 2 years of military service.
3. Be willing to apply for, and if qualified, to accept a Reserve commission in the Medical Corps of the Army, Navy, or Air Force.

B. Medical fitness standards for Reserve commission in the Medical Corps are the same as those applicable for induction as medical registrants. These standards are lower than those applicable to "Regular" registrants. Final determination of acceptability is made after application for commission.

III. PROCEDURE

A. Application for Participation in the Program: The applicant must complete and return the attached Statement of Preference (SD Form 249) before 15 September 1961. Forms received after 15 September 1961 will be considered only if there are "vacancies" unfilled by applicants who apply by the deadline date. Each question on the form should be completely and accurately answered. Failure to return the form by 15 September 1961, or to furnish all the requested information, may deprive the applicant of being called to active duty at the time he desires or of being selected for deferment

for residency training.

B. Determination of Sponsoring Service: Upon receipt at the Department of Defense, the completed Statement of Preference forms are referred to the Army, Navy, or Air Force as "sponsors" for the administrative actions related to commissioning. So far as is possible, the sponsoring service will be that indicated as first choice by the applicant. However, in some instances, where the service requirements are not matched by the applications, it may be necessary to refer an applicant to a service other than that of his first preference.

C. Commissioning: The sponsoring service will forward to the applicant information and instructions on the method of applying for a Reserve commission. All participants will be required to complete and return the application for commission to the appropriate service by 1 December 1961. This is to allow the services sufficient time in which to process the application (which normally takes from 3 to 4 months) and to tender the applicant a commission before he completes his internship. Actual participation in the program begins only with the acceptance, by the applicant, of the commission which is tendered him. The return of the application for commission, prior to 1 December 1961, is therefore an important step. If the applicant is already a member of another branch of a Reserve component of the Army, Navy, or Air Force, he must request transfer of his commission to the Medical Corps not later than 1 December 1961. This request must be made to the service in which the commission is held.

D. Call to Active Duty

1. Post-internship: Participants who indicate in paragraph 3a or 4a of the Statement of Preference that they desire active duty immediately upon completion of internship will be called to duty as vacancies occur. It is expected that the majority will be called in July and August 1962 unless they desire a later date. Applicants should notify the sponsoring service, when applying for commission, of the time of year they desire to come on duty. In the event that all those requesting a specific time cannot be brought to duty at that time, selection will be made on the basis of the order of receipt of applications for commission. As the postmark date will be used it is important that applications be submitted early.

2. Delayed Active Duty: Participants who indicate in paragraph 3b or 4b of the Statement of Preference that they desire active duty 1 year after internship may be brought to duty in July 1963. Physicians in this category may take a residency (one year) in any specialty, including general practice, or may use the year to complete the second year of a 2-year rotating internship. The services will have in deferment for residency training a sufficient number of physicians to meet their anticipated specialty requirements; therefore, it is unlikely that physicians completing one year of residency training will be assigned in their specialty field.

E. Deferment for Residency Training

1. Participants who indicate in paragraph 3c of the Statement of Preference that they desire deferment will be considered for deferment. Selection of those to be deferred will be made the latter part of September 1961. The chances of their being selected will depend upon the

number requesting deferment in their specialty and the number of positions available in that specialty. Each specialty will be considered separately, and selection will be by random choice within the specialty.

deferment for training which is over and above, or not pertinent to, their projected requirements.

3. Selection of interns to receive deferments will be made in the various specialties in the service as indicated in the table.

SPECIALTY	ARMY	NAVY	AIR FORCE
Allergy	X	X	X
Anesthesiology	X	X	X
Cardiology			X
Dermatology	X		X
Gastroenterology	X	X	X
General Practice		X	X
Internal Medicine	X	X	X
Neurology	X	X	X
Obstetrics and Gynecology	X	X	X
Ophthalmology	X	X	X
Occupational Medicine		X	X
Orthopedic Surgery	X	X	X
Pathology	X	X	X
Pediatrics	X	X	X
Physical Medicine and Rehabilitation		X	X
Preventive Medicine and Public Health	X		X
Psychiatry	X	X	X
Psychiatry (Child)			X
Pulmonary Disease		X	X
Radiology	X	X	X
Research	X	X	X
Surgery, General	X	X	X
Surgery, Plastic		X	X
Surgery, Thoracic			X
Surgery, Neurological	X		X
Urology		X	X

2. By agreement with the Director of Selective Service, The Armed Forces are permitted to defer the call to duty of commissioned residents only to the extent necessary to meet their projected requirements for specialists. These requirements must, of course, be calculated as accurately as possible some years ahead. The services are not authorized to sponsor

4. In completing paragraph 3c of the Statement of Preference, the applicant should state specifically the type of residency training he plans to undertake; e.g., internal medicine, general surgery, obstetrics and gynecology, et cetera. For specialties requiring 1 year or more of training in general surgery or internal

medicine, the specialty in which the training will eventually be received should be listed. For example, if residency training in orthopedic surgery is desired, the entry should be "orthopedic surgery" not "general surgery." Only one specialty should be entered. If more than one specialty is listed the applicant will not be considered for deferment.

5. Applicants in research fields are expected to engage in formal research programs either in fellowship or residency. Total deferment normally will not exceed 4 years and must be renewed annually.

6. Participants selected for deferment will be notified during the first week of October. They will be furnished an SD Form 247, and will be required to accomplish the following before 1 March 1962:

a. Obtain a residency, fellowship, or postgraduate training which meets the criteria of the Council on Medical Education and Hospitals of the American Medical Association and the requirements of the appropriate specialty board.

b. Complete and sign Part I of SD Form 247 (Request for Residency Training).

c. Have Part II (Hospital Agreement) of SD Form 247 completed and signed by an official of the hospital in which they will take their training.

d. Mail the form, properly executed, to: Office of Assistant Secretary of Defense (Manpower), ATTN: DASD (Health & Medical), The Pentagon, Washington 25, D. C., before 1 March 1962. If an extension of this deadline is needed, this office should be notified before the deadline date.

7. Participants who are not selected will be notified during the first week of October. They may accept the post-internship or delayed call to duty or withdraw from the program, according to their desire as expressed in paragraph 4 of the Statement of Preference.

8. It should be remembered that all participants, regardless of whether they desire immediate active duty, delay in call, or deferment to complete residency training, must apply for Reserve commissions by 1 December 1961. Failure to apply for a commission by the specified date will be construed to mean that they no longer desire to remain in the program.

9. Physicians deferred for residency training will be ordered to active duty upon completion of their training, to fill positions for which they were selected in the program. Occasionally, because of circumstances beyond the control of the Department of Defense, an anticipated position may not be available at the time a deferred resident completes his training. In such instances, the military department will notify the resident concerned with a view toward working out a mutually acceptable course of action. The duration of the period of deferment is generally that required for American Board eligibility.

10. If for any reason training is terminated prior to completion of a residency program either by the physician or the hospital where he is in training, the participant will be brought to duty at the earliest practicable date. All applicants selected for deferment are encouraged to complete all of their residency training before fulfilling their military obligation.

11. Subsequent Deferment: Physicians deferred for residency training in this program will be notified by the service in which commissioned, well in advance

of completion of a residency training year, of the status of their deferment for the following year. It is the general policy of the Department of Defense to recommend the deferment of all residents selected in this program for the minimum number of years of residency training required by the specialty boards. Forms relating to the second and subsequent years of deferment will be supplied by the service concerned and should be returned to that service.

12. Military Status: Participants who are selected for deferment in this program, although holding reserve commissions, will retain a civilian type status until such time as they actually enter on active duty. They will not receive pay from the service in which commissioned while in civilian status. Participants may accept the normal stipend paid by the hospital to its residents. It will not be necessary to obtain uniforms prior to entry on active duty.

(To be continued)

SUBMARINE MEDICINE SECTION

Personality Consideration in Sport Diving - Case Presentation

LT Harvey Z. Klein MC USNR, U.S. Naval School Deep Sea Divers, Washington 25, D.C., and Charles A. Payne, M.D., National Institute of Neurological Diseases and Blindness, National Institutes of Health, Bethesda 14, Md.

Several accidents are peculiar to deep sea diving and require prompt specific treatment. Frequently, a patient is seen presenting symptoms of decompression sickness or traumatic air embolism—two of the most serious accidents—in an area where treatment facilities are unavailable. In the haste of preparing the patient for transfer to a treatment center careful attention to the circumstances of the accident and the past history of the patient may be overlooked. The following diving accident case is reported to illustrate the importance of a careful history in these situations.

Case Presentation

A 25-year old Caucasian male who claimed to be a professional deep sea diver was rushed to a Navy recompression facility with much urgency and publicity. He gave the following history: While diving alone at a safe depth using an aqua-lung, he was allegedly dragged to a greater depth by a whirlpool and his breathing apparatus

fouled. After freeing himself, he began a rapid ascent. Halfway to the surface, aching in all joints and bleeding from the nose and mouth occurred. Swimming to shore several hundred yards away, he was able to summon help before losing consciousness. He was taken to a local hospital and given emergency treatment while a flight was being arranged for his transfer to a recompression chamber. Narcotics were used during this period to relieve pain. Upon arrival at the Navy facility 18 hours later, no record of history, physical examination, or prior treatment was available. He complained of severe pain in the joints of the left arm and leg. Orientation was normal but definite evasiveness as well as inappropriate affect was noted. Physical examination conducted just prior to recompression revealed evidence of face, arm, and leg weakness of the left side of the body. Routine measures were instituted and recompression treatment started. At the greatest pressure of treatment, he complained of spots before his eyes and paresthesias over the left side of the chest and left upper extremity. Physical examination revealed ptosis of the left eyelid, flaccid arreflexic paralysis of the left upper extremity, and questionable weakness of the left lower extremity. There was no objective evidence of sensory or visual field loss.

Remarkable response occurred during recompression. Pain was relieved only 15 minutes after initial application of pressure. This recovery, coupled with the history obtained during the first few minutes of treatment led the attending physician to conclude that this was probably decompression sickness and not a case of traumatic air embolism as was first suspected. Decompression was continued in the standard fashion on the U. S. Naval Treatment Table 4 and by the time of its termination the patient demonstrated only minimal residual paresis. Because the subject was a civilian he was then released to a private local hospital for follow-up. Neurologic examination there revealed no definite evidence of residual defect, but left arm weakness was thought to be feigned. On the evening of the first hospital day, the patient complained of sudden, sharp, anterior chest pain and bloody sputum was found at the bedside. Close follow-up of this incident with serial temperature recordings, leukocyte counts, sedimentation rates, SGOT determinations, and chest x-rays failed to reveal any evidence of tissue damage although the patient continued to complain bitterly. At first, narcotics were administered and later, an attempt was made to replace these with other analgesics. He became indignant at this and threatened to leave the hospital unless more narcotics were given. As no evidence of disease could be documented and at the patient's insistence, he was released.

The patient's personal history revealed marked instability. He had been divorced, had held numerous jobs for short periods—often in para-medical professions—, and had been discharged from military service for psychiatric reasons. It was learned that he had been treated for a similar accident at another Naval facility just two months prior to the present episode. Chest pain and hemoptysis were the principal complaints in the first diving accident and narcotics were used

at that time to relieve the symptoms. Furthermore, the patient had returned to the original hospital after completing recompression therapy requesting more narcotics. The House Staff at this point suspected that the patient was psychopathic.

He was brought to our attention again when a private physician several hundred miles away called requesting additional information. The patient had presented to this physician with the complaint of spontaneous chest pain, hemoptysis, left arm and right leg weakness, and an inconstant sensory deficit. Narcotics were being administered to control chest pain. No evidence of organic disease could be found. This additional history added further support to the diagnosis of a sociopathic disorder. The patient was subsequently admitted to a psychiatric institution for observation.

Comment

In this case, there were several inconsistencies and reasons for suspicion. The circumstances of the diving accident, the repeated demands for narcotics, the grandiose claims, the repeated accident history, the utter disregard for water safety, and the casual attitude in the face of apparent severe injury reinforced the initial impressions.

Diving accidents represent emergent situations where treatment frequently proceeds concurrently with the medical workup. Because of this, a drug addict, malingerer, or other sociopathic type can utilize this time interval to achieve his purpose be it narcotics, publicity or other secondary gain. The sport of diving has aspects which tend to attract individuals with emotional problems and personality deficiencies and the diving accident is easily feigned.

Although this case represents an extreme, it is presented as an example of a situation which has occurred often enough to warrant alerting other physicians to its existence.

The opinions and assertions expressed are those of the authors and should not be construed as official or representing the views of the Navy Department.

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Physical Standards Modified

A change in the method of submarine escape has necessitated a change in the physical standards for submarine duty with reference to the respiratory system. Prior to 1956, all submarine candidates were required to complete submarine escape training using the Momsen Lung. The Momsen Lung, as its name implies, was essentially an accessory lung. It consisted of a rubberized canvas rebreathing bag of about 5 L capacity, a small cannister containing a carbon dioxide absorbent, and a flutter-type relief valve through which excess pressure was vented into the surrounding water. Wearing this lung, with the rubber mouthpiece firmly clenched between the teeth and the

lips forming a tight seal around the mouthpiece, a man could inhale and exhale normally while ascending to the surface at a rate of approximately 50 feet per minute. In 1956, the Momsen Lung method was abandoned and in its place, the buoyant-free escape method was adopted. In this escape method the candidate is carried to the surface by the buoyancy of a partially inflated life jacket and with no accessory breathing equipment. The rate of ascent is approximately 300 feet per minute. In order to avoid traumatic air embolism, a candidate must exhale continuously before and during the ascent. For this reason, it is known as the "blow and go" method of submarine escape.

In April 1957, shortly after the "blow and go" method was adopted, a fatality occurred at New London. The cause of death was massive air embolism. The autopsy disclosed a broncholith of tuberculous origin which had acted as a ball valve within a subsegmental bronchus. Several roentgenograms were reviewed for correlation with the findings at post mortem. One, taken about one year prior to the victim's death, showed a large calcific density just beneath the aortic knob. In the interspace below, and projected more laterally, another calcific density was found. The broncholith was not clearly discernible.

This case was followed by several more non-fatal air embolism accidents in which chest roentgenograms disclosed calcific lesions. Under ordinary circumstances, however, these would have been diagnosed as normal chest roentgenograms. These cases are described in the U.S. Armed Forces Medical Journal, March 1959 and J.A.M.A., February 4, 1961.

This experience prompted the Medical officers at New London to begin performing 14 by 17 inch chest roentgenograms on every submarine candidate. Due to the high risk involved, men demonstrating any chronic pathologic processes which could produce air trapping during the ascent were not accepted for submarine duty. A new finding, however, emerged from this experience. Three cases of active tuberculosis were uncovered among approximately 6000 submarine candidates. In the confined atmosphere of a submarine, an active case of tuberculosis is, of course, a major health hazard. All this experience has resulted in a revision of Article 15-29(2)(g) which now reads as follows:

"(g) Respiratory System. Particular effort shall be made to detect tuberculosis or other chronic diseases of the lungs. The examination must include a review of the medical history, a 14 by 17 chest x-ray, and a tuberculin test done in accordance with Article 15-91. A positive tuberculin reaction (induration over 5 mm) shall be cause for further study before the candidate is accepted for submarine duty. Submarine candidates are required to complete buoyant submarine escape training. In the course of this training, any impairment of pulmonary ventilation is likely to produce traumatic air embolism. In view of this, candidates with chronic inflammatory diseases of the lungs and ventilatory impairment cannot be accepted. Chronic inflammatory diseases are considered disqualifying in any case where activity can be definitely demonstrated or reasonably assumed; for example, in tuberculosis, histoplasmosis, coccidioidomycosis, sarcoidosis, bronchiectasis, or abscess.

Those candidates who can be reasonably presumed to have ventilatory impairment must be disqualified; for example, in perennial bronchial asthma, pulmonary interstitial fibrosis, extensive parenchymal scarring or calcification, emphysema, cystic disease, fixation of the bony thorax or deformity thereof (severe pectus excavatum, Still's disease), history of extensive thoracic surgical procedures, spontaneous pneumothorax (within the past 5 years), or extensive pleural scarring."

This Manual change has obtained the necessary Navy Department approval and will be promulgated in the near future. All activities conducting physical examinations for submarine duty are requested to adhere to these standards in advance of receipt of the Manual Change.

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PREVENTIVE MEDICINE

Chemical Food Poisoning Involving Fish

Robert C. Stanfill, District Director, FDA. Quarterly Bulletin, Assn of Food and Drug Officials of the United States 25: 31-38, January 1961.

Two years ago, in a large metropolitan area, an investigation was characterized by prompt action, the closest cooperation by Federal, State, and local agencies, and investigational and analytical work plus coordination of information by the Food and Drug Administration of the U. S. Department of Health, Education, and Welfare, despite a complete breakdown of overloaded lines of communication.

A paper, "Administrative Problems Associated with the Philadelphia Poison Fish Incident," by M. A. Shiffman, M. Werrin, and S. Fish, of the Philadelphia Department of Public Health, was presented before the Conference of Municipal Public Health Engineers, 22 October 1959, describing many interesting facets of the case, including the successes and failures in communications.

Hundreds of news stories were published about the case during the investigation, at the time a Federal Grand Jury indicted defendants, and at the conclusion of the trial. Official Detective Stories carried an article, "The Poison Food Panic," in the January 1960 issue.

Summary

A 3-year old child died on the evening of 24 March 1959, and other members

of the family became ill after eating fillet of flounder cooked in their home in Haddon Heights, N.J. Three women were hospitalized the same evening after eating fillet of flounder at a Philadelphia, Pa., restaurant. Examination of remaining fillets in Haddon Heights, N.J. and in the Philadelphia restaurant disclosed large quantities of sodium nitrite.

Investigation of 25 March 1959 disclosed that shipments of the nitrite treated fillets had been confined to a chain of food markets supplied by its own warehouse in Yeadon, Pa., plus the one restaurant. The chain store deliveries did not go beyond Southern and Central New Jersey, upper Delaware, and Pennsylvania points not more than about 50 miles from Philadelphia. A number of other cases of illness occurred in Pennsylvania, New Jersey, and in Wilmington, Del. Fillets of flounder and fluke were promptly withheld from sale by the stores

Sodium nitrite looks like table salt which is used in a brine for fillets, but has a quite different appearance under the microscope. At first, it was thought sodium nitrite may have been substituted accidentally. Investigation revealed that the defendants on several occasions had had fish returned because of decomposition and had used sodium nitrite on 1300 pounds of such returned fillets to "fresh it" or remove the stink and slime. This happened a day or two before the tragic death of the child.

The facts were presented to a Federal Grand Jury. The Grand Jury indicted the fish processor, Universal Seafood Company, Inc. of Philadelphia, its president and treasurer, and the foreman. They were charged with treating the fish with sodium nitrite, a poisonous and deleterious preservative with intent to mislead and defraud. The corporation which went out of business soon after the poisoning was publicized was fined $100. The president was fined $2500 and sentenced to one year in jail, with 11 months suspended during a 3-year probation period. The president's attorney petitioned the court to release him from jail and presented medical testimony that he had a heart disease and imprisonment was not good for his health; thus he was released after 16 days. The plant foreman pleaded not guilty and the case against him was dismissed.

Nationwide investigations of domestic and imported fish and fish products were carried out promptly after this incident. Investigations showed only isolated cases of use of sodium nitrite in fish processing. In all instances, the concentrations of sodium nitrite were much lower than those employed for the spoiled flounder. Four seizures were made of seafood treated in domestic plants. Some countries permit such use, but imported seafood treated with sodium nitrite is denied entry into the United States. Four lots of nitrite treated fish imported before this investigation were seized.

The child became ill very soon after eating the fish, starting turning blue, and upon arrival at Cooper Hospital he was a very dark blue and dead. Other hospitalized members of the family suffered dizziness, nausea, and cyanosis. So did the women who became ill after eating flounder in Philadelphia.

The District Food and Drug Administration concluded that sodium nitrite was the most probable cause,

whereupon the Chief Chemist assigned chemists to run tests for nitrites on numerous foods to establish blanks. The resident physician of the hospital ordered all members of the family brought in for treatment, and not knowing the cause of the poisoning, he telephoned the Philadelphia Poison Control Center about getting botulinus antitoxin. After checking with the Chief of Philadelphia's Communicable Disease Section, the Poison Control Center told the hospital that the antitoxin was not available, but symptoms indicated chemical poisoning and suggested injections of methylene blue intravenously.

Later the same evening, the Poison Control Center informed the Chief of the Philadelphia Milk and Food Sanitation Section, Dr. M.A. Shiffman, that three women who had eaten at a Philadelphia restaurant were hospitalized in two hospitals after they became ill within an hour after the meal, all having eaten flounder. All clinical symptoms subsided after methylene blue treatment. One of the hospitals promptly diagnosed the case as nitrite poisoning.

Information obtained by the inspectors, the Food and Drug Administration, and other agencies pointed to the fillet of flounder from the Universal Seafood Company. By late afternoon, the FDA heard about the food poisoning incidents and found and confirmed quantitatively the presence of as much as 10,000 parts per million of sodium nitrite.

Meantime, the Philadelphia Department of Public Health Inspectors, New Jersey Department of Health personnel, Camden County New Jersey Detective Bureau, Haddon Regional Health Commission, and many other local officials were investigating reports of illnesses and sampling fish, searching for records of sales of sodium nitrite, and participating in individual and group efforts to obtain the facts. Information poured in definitely showing the presence of large quantities of sodium nitrite in the fillets delivered to the Yeadon chain store warehouse and the one restaurant sale, but fillets sold to other stores by the same and other fish dealers did not show such evidence. These findings narrowed down the probable distribution of toxic fillets. Evidence of nitrites was present under the brine hoops, on the concrete floor, and on the cutting table of the Universal Seafood Company, Inc. The president and employees denied any use of nitrites. The proof was not yet definite as to how the incident occurred.

Warnings were issued to the public via radio, television, and the press within the limited area of distribution that a quantity of flounder fillets had been treated with dangerous to lethal quantities of a toxic chemical identified as a nitrite, and that some of it undoubtedly remained in home and restaurant refrigerators for use at any time during the few remaining days of the Lenten season. One agency had information that purported the contaminated fillets had originated at New Bedford, Mass., so warning went out on a 13 or 14-state police teletype instead of a 3-state alarm as intended. Communication became more difficult and no contact could be made with Washington. That evening, the president of the Universal Seafood Company appeared on a Philadelphia TV program denying, as spokesman of the fish industry, that any one in fish industry had or would

use sodium nitrite. The author and the Philadelphia Director of the Public Health Services also appeared on TV to assure the public that distribution of the poisoned fish did not go beyond the nearby 3-state area around Philadelphia.

On Good Friday, the persistence of a Food and Drug Inspector resulted in the manager of a chemical and salt supply house joining him in a search of the firm's sales records covering a period of more than a year. The records showed a hurry-up early morning delivery of 400 pounds of sodium nitrite being rushed to Universal Seafood Company, Inc., the Monday before the child died on Tuesday night. A smaller shipment had been delivered during Lent the year before. Investigation disclosed that the president of the Universal Seafood Company had personally authorized the order and personally accompanied the 400 lb drum marked with bold red letters, from the truck to the filleting room.

Much has been said about the persistent investigational work by food and drug inspectors, police officers, and health officers, public health inspectors and agents. The quiet efficient work done in the laboratory is less likely to be publicized, such as the Medical Examiners Laboratory of the City of Philadelphia, the State Police Laboratory in Bordentown, N.J., and the New Jersey Department of Health. The Philadelphia District Food and Drug Administration laboratory personnel proceeded to set up for three types of laboratory work: (1) to use conventional chemical tests for nitrites on suspect fish, equipment, brine, washing powders, et cetera; (2) to develop rapid colorimetric improved qualitative and microscopic tests; and (3) to make bacteriologic studies of the effect of sodium nitrite on decomposed fish.

The Chief, Chemical Laboratory, New York City Bureau of Food and Drugs, reported a field test for nitrites on fish fillets suggested for use by inspectors. The qualitative test is run on a small portion of fish, i.e., 10 gm macerated with 5 ml distilled water in a porcelain dish. The test consists of adding 5 to 10 drops of saturated sulfonamide solution, then 5 to 10 drops hydrochloric acid, 1 + 1- (approximately 6N). Stir, and wait about 2 minutes, then add 5 drops of N-(1 Napthyl)-ethylenediamine dihydrochloride reagent-0.1% aqueous solution which is not more than a week old and has been stored in a dark glass bottle in the cold.

Several members of the FDA's Philadelphia District Laboratory staff contributed to increasing the speed and accuracy of qualitative and quantitative methods, and one of these has been reported in "Bureau By-Lines" by Harry Shuman and Edward Woznicki, another by Rosa F. Minsker.

When the modified Griess reagent (Methods of Analysis, A.O.A.C., 8th Ed., para 23.16) is applied directly to the fish or other materials being tested, it gives an excellent qualitative test for nitrites. The reagent will give the red color of the azo dye if acted on by nitrous acid. It is sensitive to about 2 ppm. When amounts as high as 5000-10,000 ppm are present, the characteristic red color ultimately turns to brownish yellow. The test was effective on fish, wood shavings from brining tanks, storage bins, and work areas.

Authentic wood samples, untreated fish, and fresh meat were negative.

Salt crystals and sodium nitrite

were extracted in the District FDA laboratory from the lot of fillets involved in the child's death. Salt crystals are characteristically rectangular or cubical in structure, whereas the sodium nitrite crystals are characteristically feathery in appearance.

A bacteriologist of the above laboratory examined fresh fillets of good quality and normal odor. The bacteria count was low. He exposed fillets to different temperatures for various time periods until there were different degrees of intensity in sliminess and odor of decomposition. He treated fresh fillets and fillets held at different times and temperatures with varying concentrations of sodium nitrite brine, then took total counts and plate counts of viable organisms. Except in the case of the most advanced stages of decomposition, treatment with sodium nitrite "freshened" the appearance, feel, and odor of decomposing of stale fillets.

After learning that this "freshening" effect could be demonstrated, the author continued investigations until records were located showing that the Universal Seafood Company had suffered losses because chain store managers refused or returned for credit a number of lots of fillets because of decomposition. One lot of about 1300 pounds had been returned from Scranton, Pa., over the weekend immediately before the delivery to the fish house of a 400-pound drum of sodium nitrite.

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Public Health Pesticides

Technical Development Laboratories, Communicable Disease Center, PHS, DHEW, Savannah, Ga. Public Health Pesticides for Mosquitoes, Flies, Fleas, Roaches, Bedbugs, Ticks, Chiggers, Lice, Rodents. Pest Control, 29:9-27, March 1961.

One of the causes of insect control failure through use of insecticides is the fact that results of investigations may be allied to the geographic area in which the work was conducted. Few chemical measures are equally effective against a number of species under a variety of environmental conditions. Similarly, the efficacy of a given toxicant against a particular species may vary considerably in different localities according to prevailing ecologic and biologic factors.

A second cause of control failure is attempt to place full reliance upon a chemical treatment instead of recognizing that pesticides are usually secondary or supplementary to measures which reduce or curtail the breeding potential of the pest (drainage, filling, et cetera in mosquito control; proper storage and disposal of garbage in fly control). Conversely, maximum reduction cannot be achieved without use of chemicals. This may not apply to disease control since this has been accomplished in some countries with pesticides which affect only a segment of the arthropod population (i. e., mosquito vectors entering habitations).

A third factor behind unsuccessful arthropod and rodent control is the tendency of operational personnel to rely on a single type of treatment or

toxicant, thus making the chemical measure and the operational program one and the same. For example, a poultry man, instead of relying on either poison baits or impregnated cords for fly control, may find that the combined use of the two technics will provide the highest level of abatement. The cords would serve as a long-term suppressive measure, the baits being used for emergency application in the event that sanitational deficiencies caused a temporary up surge in fly production beyond control capacity of the cords. The ability to organize a system of effective insecticidal applications stems largely from the background, experience, and training of the supervisor, qualifications that cannot be overemphasized.

Insect resistance to pesticides has been a major problem in many areas. Technical procedures are available which enable the control operator to determine if resistance is present in a species. Too often, sloppy spray technics, inadequate knowledge of insect habits, and a low standard of sanitation are hidden beneath the guise of resistance.

Another fallacy in interpretation of resistance data is the tendency to place undue emphasis on a slight change in the response of the insect to a given toxicant. Any decrease in susceptibility must be coupled with observation of the field efficacy of the chemical treatment before the operator seeks another or considers a change of toxicants or of procedure.

Obviously, each control situation demands greater emphasis on certain characteristics of the pesticide (i.e., odor, cost, toxicologic hazard, persistence). Thus, each operator is required to make his own evaluation as to the "best" toxicant to employ.

In formulating and applying any pesticide, the user must follow handling practices which minimize the hazards of contaminating food, water, animals, or man. The choice in selecting the concentration and type of formulation is influenced by the coverage necessary, type of surface to be treated, toxicity of the pesticide, transportation requirements, and equipment available.

Mosquito Control. In areas where culicine mosquitoes have become resistant to the chlorinated hydrocarbon insecticides, the organophosphorus toxicants have proved to be effective replacements. Control consists of use of residual adulticides (DDT, dieldrin, BHC, malathion, Bayer Compound 29493, and DDVP depending upon specific requirements due to insecticide resistance); space treatments (DDT or malathion ground dispersal fogs or aerial dispersal); temporary larvicides (DDT, dieldrin, chlordane, heptachlor, lindane, organophosphorus compounds, Paris green pellets); and residual larvicides (these require greater rates of application than temporary larviciding, with a consequent greater hazard to fish and wildlife). A residual larvicide in the form of dieldrin cement-pellets for control of domestic species such as Aedes aegypti in fire barrels is effective.

Fly Control. Because of general resistance of the housefly to the chlorinated hydrocarbon insecticides, chief reliance for chemical control is now placed upon the organophosphorus toxicants. Without sanitation, application of insecticides is a costly and inefficient tool.

Fly control consists of residual

treatments (Diazinon, malathion, and ronnel in dairy barns). Sugar is added to augment the efficacy of the residues. Bayer 29493, DDVP, and Dibrom have also given good control. Treatment of dairy and beef animals with insecticidal sprays, dusts, and dips aid in control as well as the use of impregnated cords, poison baits, (malathion, ronnel, Bayer L13/59, Diazinon, Dibrom, and DDVP in dairy barns), outdoor space sprays, and larvicides.

Flea Control. Except for a single report of DDT resistance in Xenopsylla cheopis in India, the vector of murine typhus and plague continues to be susceptible to DDT. DDT dust (5 to 10%) applied to runways and harborage areas of rats will give excellent control. Yard infestations of dog and cat fleas have been controlled with 1% emulsion (1 gallon per 1000 sq ft) of Bayer L13/59, malathion, lindane, ronnel, and Diazinon. Flea infestations of dogs and cats may be controlled by treatment with malathion (3-5% dust; 0.5% spray), rotenone (1% dust); or synergized pyrethrum (0.2% dust). In addition, lindane (1% dust) or chlordane (2-4% dust) is suitable for use on dogs only.

Roach Control. German roaches have developed resistance to chlordane in many areas of the United States. They are not resistant to the organophosphorus pesticides. Diazinon dust has been the most effective of dusts tested in households in Florida. However, oil and water based sprays are considered to be more effective than dusts. Application of any of these pesticides in households, or in food handling establishments should be as a spot treatment, utilizing a coarse spray or a dust to treat baseboards, along water pipes, and in other roach harborage areas and runways. To obtain quick kill in heavy roach infestations or to drive the insects from protected recesses, the use of aerosol formulations of pyrethrum alone or in combination with a residual treatment is of value.

Bedbug Control. DDT remains the insecticide of choice for controlling the bedbug in homes in the United States. In other countries, spotted occurrences of resistance have been detected. Lindane (0.1% for beds and mattresses or 0.5% elsewhere), ronnel (1%) or malathion (0.5-1%) usually provide satisfactory results. Light applications only should be made to mattresses and upholstery. Treatment of infant bedding, including the crib, should be avoided. Synergized pyrethrin sprays (0.2% pyrethrin) alone also are effective against DDT-resistant bedbugs. Two or more treatments may be required at intervals of 2 to 6 weeks.

Tick and Chigger Control. Either Diazinon emulsion (0.5%) or malathion in deodorized kerosene (1%) is effective against brown dog ticks in dwellings. They should be applied as spot treatments to baseboards, floor and wall crevices, and other harborage sites only. Dusts of lindane (1%), chlordane (2-3%), DDT (5%) and malathion (3-5%) can be supplied directly to dogs. Neither Diazinon nor dieldrin should be used in treating the animal. Area control of ticks may be obtained with suspensions, emulsions, or dust formulations of DDT, chlordane, dieldrin, and toxaphene at rates of 1.0 to 2.0 pounds of toxicant per acre, or BHC at 0.5 pound of the gamma isomer per acre. Area infestations of chiggers can be controlled with spray or dust treatments of

toxaphene or chlordane (1 to 2 lbs per acre), lindane (0.25 or 0.5 lb per acre), or dieldrin (0.6 to 1.0 lb per acre). Application rates of 40 lbs of dust or 50 gallons of spray per acre may be required for tick or chigger control. Application to water must be avoided because of toxicity to fish.

Louse Control. DDT (10% dust) and lindane (1% dust) have been used successfully in control of the body louse. One percent malathion powder is effective against both adults and eggs of the body louse according to experimental evidence. This material is used when body lice have displayed resistance to DDT and lindane.

Rodent Control. The anticoagulant poisons are preferred for use in most situations because of their effectiveness against rats and mice and their low degree of toxic hazard to human beings and domestic animals. To achieve permanent rat control, sanitation measures such as proper garbage disposal and food storage, harborage elimination and rat proofing must be followed diligently.

Rodenticides are supplemental to, and not a substitute for, sanitation. Anticoagulant poisons include Pival, warfarin, Diphacinone, Fumarin, and PMP; warfarin being used most extensively. Investigations have shown yellow corn meal to be the most readily accepted inexpensive bait material. It is suggested as the initial bait in rodenticide operations. The baits must be continuously available for at least 2 weeks. Under conditions where food is readily available, anticoagulants in water, with 5% sugar as an attractant, will give good results if other sources of water are removed.

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Detecting Gonorrhea in Asymptomatic Females

The authors present a study designed to explore the usefulness of the delayed fluorescent antibody method for detecting Neisseria gonorrhoeae in females who had not been named as sexual contacts of male gonorrhea patients.

Routine admission female jail inmates—162 Negro and 51 white—who were found to be free of any sign or symptom of gonococcal infection were examined. Using the delayed fluorescent antibody method, N. gonorrhoeae was detected in 44, or 20.6%, on examination of urethral, cervical, and vaginal sites. Examination of all three sites produced more positive findings than did examination of any one site or any combination of two sites. Reexamination of 74 women showed that in this type of patient, additional positive sites could occasionally be obtained by a second examination.

Since the efficiency of the fluorescent antibody technic for detection of N. gonorrhoeae in the female compared with culture, isolation, and fermentation procedures had been determined in a previous study, culture comparisons were not made.
(A. D. Harris, et al, Public Health Reports, February 1961)

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Field Test Procedure for Cleanliness Measurement of Eating Utensils

G. M. Ridenour and E. H. Armbruster. Field Test Procedure for Cleanliness Measurement of Multiple Use Eating Utensils. The Sanitarian 23: 103-104, September - October 1960.

Everyone has probably encountered the greasy feeling of visibly clean-appearing dishes, glasses, or silverware at some time or other. Fats, greases, and oils constitute a class of most difficultly removed food soils; consequently, their presence or absence is the best indicator of effective or ineffective cleaning procedures. They occur not only naturally in the composition of the food, but also are used in preparation of a considerable portion of each meal. Therefore, they are always present and no artificial test soil is needed.

In development of a field test it seemed logical that a visible fat selective dye that would stain the residual grease on a utensil might give the necessary information. Sudan type dyes have been found to perform excellently in this respect. However, since these dyes are soluble only in organic solvents such as alcohol, this would become an expensive procedure. More detrimental than that, when excess stain is removed from the utensil by flushing, the Sudan dye tends to precipitate and in some cases produces a grease-like reaction even on a grease free surface.

A second approach to the problem of visible detection of grease films might be to absorb a powder to the grease, such as is used in detection of fingerprints. A number of insoluble colloids were investigated; they performed excellently in this respect. Among these substances was common talc. Since it is white, a water soluble dye was added to the talc to give it color. Addition of the water soluble dye to the talc not only permits staining of grease residuals on the surface, but also staining of protein or starch films too thin to be viewed by the naked eye.

Procedure

The reagent consists of 85% talc and 15% Safranine-O by weight. The dry talc and dye powder are thoroughly mixed and put into a salt shaker. This dye mixture is then gently dusted over the surface to be examined from a height of not more than 2 inches. Cups and glasses have the powder dusted over the inner bottom surface only. A light application of powder will suffice and it is not necessary that the entire surface be covered. Surfaces to be examined by this method must be thoroughly dry before dusting with the dye mixture. This dusting is best done in a deep sink. The dusted utensil is now held under a flowing water tap for at least 5 seconds or until no remaining trace of red color is rinsing off. The utensil is then drained on edge in the case of dishes or, in the case of cups, upside down until dry. Any red color is an indication of a soiled area. The intensity of the red color is roughly quantitative with respect to the amount of residual soil film remaining on the surfaces. Water spots have not been

found to interfere as they do not stain. The stained soil is easily removed in a proper dishwashing operation.

This procedure may be used on a variety of materials such as glass, china, silverware, stainless steel and on most plastics. The common melamine surface can be measured by this procedure only while it retains the mold finish. When it has been badly worn to a point where the mold finish has been removed, a false staining action may result. However, radioisotope studies in the National Sanitation Foundation laboratory have shown that badly worn plastic surfaces cannot be cleaned by ordinary washing procedures.

Applications

The first and most obvious use for this procedure is to provide a gauge of dishwashing effectiveness in a given food service establishment. The advantage gained by this method is that the sanitarian can make his inspections during the slack periods of the day and check the effectiveness of the cleaning operation which was carried on during the busiest period. Improper washing due to insufficient detergent, improper detergent, overloading dishwashing racks, and clogged jets, as well as general dishwasher spray pattern are easily recognized from the appearance of the treated dishes. A very good operation will produce a dish which will take up no stain whatsoever. A passing operation may show a very faint pink haze, while the improper operations invariably show a good deal of bright red color. This procedure may also be used to determine whether the clean dishes have been handled properly after washing. Even fingerprints show up as red smudges and are easily recognized by the whorl pattern.

In the laboratory, this procedure has been used to compare detergents and detergent concentrations in relation to effective cleaning. First, china dishes are hand scrubbed with a kitchen cleanser, dried, and then soiled with a small amount of cooking oil or grease. Then they are washed in a conventional dishwasher, dried, and grease residuals stained for comparison.

In field studies, we have found that dishes washed improperly over a period of time built up such a strongly bound soil film that up to twelve proper washings may be required to produce truly clean surfaces.

Conclusions

A field test procedure has been presented which gives a visible measure of residual films of mutton tallow, beef tallow, bacon grease, butter, cooking oils, human greases, protein, and starch on eating utensil surfaces. The test is easily applied in the field and provides an immediate means of evaluating the efficiency of cleaning procedures. It will also aid in identifying poor practices in the handling of utensils after the cleaning operation.

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IN MEMORIAM

Hudson, Joseph S. LTJG MSC USN (Ret)	
USAF Hospital, Travis Air Force Base, Calif.	21 April 1961
Ingersoll, Frederick M. CAPT DC USN (Ret)	
San Diego, Calif.	22 April 1961
Prather, Victor A. Jr, LCDR MC USN	
USS ANTIETAM	4 May 1961
Hoag, Eric B. CAPT DC USN (Ret)	
Towanda, Pa.	7 May 1961
Wenzel, Edmund U. LCDR MC USNR	
U.S. Naval Hospital, Jacksonville, Fla.	30 May 1961
Nyland, Frances L. ENS NC USN (Ret)	
U.S. Naval Hospital, Bremerton, Wash.	1 June 1961
Irvine, William L. CAPT MC USN (Ret)	
San Diego, Calif.	2 June 1961
Horrigan, David E. Sr, LCDR MC USN (Ret)	
Washington, D. C.	8 June 1961
Lisbony, Irving R. LCDR MSC USN (Ret)	
U.S. Navy Hospital, Corpus Christi, Texas	11 June 1961

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